Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of:	)	
	)	
Fixed and Mobile Services in the Mobile	)	
Satellite Service Bands at 1525-1559 MHz	)	ET Docket 10-142
and 1626.5-1660.5 MHz, 1610-1626.5 MHz	)	
and 2483.5-2500 MHz, and 2000-2020 MHz	)	
and 2180-2200 MHz	)	
	)	

COMMENTS OF INMARSAT

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Summary

As the operator of a global fleet of eleven geostationary mobile satellite service ("MSS") spacecraft, and a provider of essential MSS services around the world for over three decades, Inmarsat has a unique perspective on the Commission's proposals to adjust existing rules governing MSS operations in certain frequency bands in an effort to further the goals of the National Broadband Plan. Inmarsat's focus is on the L band, where it has been serving the vital needs of public safety, disaster relief, critical infrastructure and other sensitive users for many years.

As an initial matter, Inmarsat agrees with the Commission that any proposal to add a co-primary terrestrial allocation should be limited to the 2 GHz MSS band. Inmarsat also notes that, even if the current 2 GHz MSS licensees are unable to develop a commercial service, this does not mean that other MSS operators, like Inmarsat, would be incapable of doing so if that band were made available. Thus, if the Commission does reclaim spectrum from the existing 2 GHz MSS licensees, it should consider making the 2 GHz band available to other MSS operators, and allow other MSS operators to utilize this globally harmonized MSS band to expand their satellite services.

Inmarsat generally supports the Commission's proposal to allow MSS operators to lease their spectrum to third parties for Ancillary Terrestrial Component ("ATC") use. By facilitating appropriate spectrum lease arrangements, the Commission would facilitate the ability of MSS operators to deploy ATC, and thus the increased availability of supplemental broadband capabilities in MSS bands. Inmarsat believes, however, that certain targeted changes to the Commission's *Secondary Markets* leasing framework—which was designed around terrestrial wireless assumptions—would be appropriate both to address issues unique to the terrestrial use of MSS spectrum, and to ensure that MSS offerings are protected from interference. For example, it may be

appropriate to allow only "spectrum manager" leases, which would ensure that MSS operators retain ultimate control over the use of MSS spectrum—and thus the ability to manage interference by coordinating satellite and terrestrial operations. Moreover, the Commission should clarify that any *Secondary Markets* leases involving ATC uses are permissible only after the MSS operator, either independently or together with its potential lessee(s), has demonstrated how it would satisfy the relevant gating criteria.

More generally, Inmarsat appreciates the Commission's willingness to solicit comment on other measures that it might take to maximize the benefits derived from the use of MSS spectrum. In evaluating such measures, Inmarsat urges the Commission to embrace a broad view that considers both the quantitative and the qualitative benefits derived from the availability of MSS in any given band. Only by adopting such an approach can the Commission ensure that it properly considers the full value of MSS service, including existing operations that already leverage the unique capabilities of satellites to serve the public interest—such as the ability to serve rural and remote areas efficiently, using the same low-cost terminals and distance-insensitive cost structure used to serve more populated regions.

The L band, which Inmarsat users rely on in the United States and around the world, is especially suited for MSS operations because of its favorable propagation characteristics and the existence of a globally-harmonized international MSS allocation. As detailed below, Inmarsat currently employs its L-band spectrum to provide critical services and capabilities to users who could not otherwise access those services and capabilities, including users in the maritime, aviation, military, public safety, media, energy, and farming sectors. Moreover, Inmarsat services increasingly support nascent applications in the rural healthcare, smart grid, and disaster sectors, as well as rural telephony and data services.

These L-band operations should be insulated from any measures that may have the effect of limiting satellite operations in other MSS bands.

Inmarsat needs more spectrum and even greater flexibility to use that spectrum in order to meet the growing requirements of its subscribers. These considerations, along with recent experiences in the European Union, suggest that the Commission can and should consider measured changes to its existing rules in order to increase the operational flexibility of MSS operators. The Commission should, for example, permit more flexibility in MSS spectrum leases, authorize MSS operators to provide service from "fixed" points, and relax certain of the ATC "gating criteria" (provided that any such changes ensure that MSS operations are protected in the MSS bands by retaining geographic satellite coverage and substantial satellite service requirements, as well as measures to protect against interference). The Commission should, however, avoid other measures such as the imposition of spectrum fees that would undermine efficiency and harm growth and innovation in the MSS industry.

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COMMENTS OF INMARSAT

Inmarsat, Inc. ("Inmarsat") submits these comments in response to the *Notice of Proposed Rulemaking and Notice of Inquiry*[1] ("*Notice*") released on July 15, 2010 in the above-referenced proceedings. In the *Notice*, the Commission proposes certain changes to existing rules for the 2 GHz mobile satellite service ("MSS") band which are intended to make additional spectrum available for terrestrial wireless broadband applications. The Commission also seeks comment on further steps that it can take to increase the value, utilization, innovation, and investment in MSS spectrum.

As a leading provider of MSS services for over three decades, Inmarsat appreciates the opportunity to once again provide comments in response to the Commission's larger effort to develop and implement the National Broadband Plan.[2] Inmarsat shares the

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1 *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Notice of Proposed Rulemaking and Notice of Inquiry, ET Docket No. 10-142, FCC 10-126 (rel. July 15, 2010) ("*Notice*").

2 Inmarsat has previously participated in several related proceedings on its own and as a member of the Satellite Industry Association, the American Telemedicine Association, and the MSS/ATC Coalition. *See, e.g.*, Reply Comments of Inmarsat Inc., GN Docket Nos. 09-47, 51 and 137 (filed Nov. 13, 2009) (NBP Public Notice #6); Comments of Inmarsat Inc., GN Docket Nos. 09-47, 51 and 137 (filed Dec. 1, 2009) (NBP Public Notice #14); Notice of Ex Parte Presentation of Inmarsat, Inc., GN Docket Nos. 09-47, 51 and 137, WC Docket No. 02-60 (filed Dec. 4, 2009) (NBP Public Notice #17); Comments of the Satellite Industry Association, GN Docket Nos. 09-47, 51 and 137 (filed Oct. 23, 2009) (NBP Public Notice #6); Reply Comments of

Commission's desire to ensure that MSS spectrum remains efficiently used. For that reason, Inmarsat urges the Commission, whatever it decides with respect to the 2 GHz band, to ensure that this rulemaking does not disrupt the needs or expectations of MSS users in the L band, which is heavily used around the world, and especially suited for its current purposes (which include public safety, disaster response, and other critical applications) given its propagation characteristics and globally-harmonized MSS allocation.

Inmarsat also urges the Commission to evaluate carefully any proposal to increase the "efficient" use of MSS spectrum—particularly by terrestrial users. Certain changes to existing rules may be appropriate to facilitate the deployment of an ancillary terrestrial component ("ATC") supplement to the L band, but any such changes should ensure that substantial satellite service remains a primary focus of the L band. As demonstrated below, Inmarsat and other MSS operators already are making highly-efficient use of their spectrum, and are leveraging the unique capabilities of satellites to serve critical sectors (*e.g.*, maritime, military, and public safety users) and to support nascent applications (*e.g.*, rural telemedicine and smart grid applications). Indeed, the increasing breadth of and demand for Inmarsat's services demands access to more, not less, spectrum, and greater flexibility to allow MSS operators to make even more robust use of that spectrum for satellite-based services.

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the Satellite Industry Association, GN Docket Nos. 09-47, 51 and 137 (filed Nov. 13, 2009) (NBP Public Notice #6); Comments of the Satellite Industry Association, GN Docket Nos. 09-47, 51 and 137 (filed Nov. 4, 2009) (NBP Public Notice #11); Comments of the Satellite Industry Association, GN Docket Nos. 09-47, 51 and 137 (filed Dec. 4, 2009) (NBP Public Notice #23); Comments of the American Telemedicine Association, GN Docket Nos. 09-157 and 51 (filed Sept. 30, 2009) (NBP Public Notice #11); Comments of the American Telemedicine Association, GN Dockets Nos. 09-47, 51 and 137, WC Docket No. 02-60 (filed Dec. 3, 2009); Comments of MSS/ATC Coalition, GN Docket Nos. 09-47, 51 and 137 (filed Aug. 31, 2009) (NBP Public Notice #1).

I. BACKGROUND

Inmarsat has provided MSS in the L Band for over 30 years, and has a long history of investing in state-of-the-art technology in order to respond to the evolving demands of its diverse customer base and a highly competitive marketplace. These forces drive the continued improvements in Inmarsat spacecraft and user terminal design, and the more intensive use of the limited spectrum resource that occurs with each new generation of Inmarsat spacecraft. The demands of the marketplace also demonstrate the continued growth and vitality of MSS, both in the L band, as well as in other frequency bands.

Over the last several years, Inmarsat has invested well over $1.5 billion in the deployment of its fourth-generation Inmarsat 4 ("I-4") satellite network in the L band. This network is designed to provide a variety of broadband services, and supplements the capabilities of the eight prior-generation Inmarsat spacecraft on which numerous end users still rely for their critical communications needs. The I-4 fleet consists of some of the most advanced commercial communications satellites now in orbit, which satisfy the mobile communications needs of users in the United States and around the rest of the world. The 2008 launch of the third and final I-4 spacecraft completed a world-wide footprint for Inmarsat's new broadband services, and enabled a major satellite fleet repositioning that allows those services to be provided even more efficiently than before. Significantly, that fleet realignment now affords optimized coverage of the United States.[3] In connection with deploying its I-4 fleet, Inmarsat made a significant commitment to serve the United States by investing in the construction of a Commission-authorized gateway facility in Paumalu,

[3] *See* Press Release, Inmarsat, *Inmarsat Broadband Goes Global* (Feb. 26, 2009) *available at* http://www.inmarsat.com/About/Newsroom/Press/00024689.aspx?language=EN&textonly=False (announcing completion of global coverage for Inmarsat broadband services).

Hawaii, which connects Inmarsat users to the public switched telephone network and the Internet, and enables the control of the Inmarsat fleet visible from Hawaii.[4]

In order to remain competitive in the dynamic market for satellite services and respond to evolving customer demand, Inmarsat has designed its I-4 satellite fleet to support a new class of novel, IP-based communications, including the land-based Broadband Global Area Network ("BGAN") service, the aeronautical SwiftBroadband service, the maritime FleetBroadband service, and the handheld Global Satellite Phone Service ("GSPS"). Using highly portable and easily deployed "notebook sized" antennas that are one-third the size, weight, and price of traditional Inmarsat terminals, BGAN provides voice and broadband service at speeds of almost half a megabit per second. Simply connecting a BGAN antenna to any laptop computer with a USB, WiFi or Bluetooth connection enables an immediate means of communication anywhere in the United States (and globally).[5] BGAN facilitates critical communications in "hard to serve" areas, both rural and remote, and also provides reliable and easy-to-deploy connectivity when the terrestrial network fails or is not reliable. BGAN therefore delivers significant public interest benefits to a wide variety of users, including government, military, and public safety users, as well as relief organizations, news organizations, and business customers of all types. These same types of broadband capabilities are now available to maritime and aeronautical users, through Inmarsat's SwiftBroadband and FleetBroadband services, which employ small antennas that are optimized for ships and airplanes.

The advanced design of the I-4 fleet has allowed Inmarsat to continue to evolve its broadband offerings in response to customer demand. For example, in order to address the needs of broadcasters, Inmarsat developed an enhanced form of BGAN service

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[4] *See* IBFS File Nos. SES-LIC-20080306-00242 (granted Dec. 18, 2008) (Call Sign E080059); SES-MFS-20080228-00207 (granted Dec. 18, 2008) (Call Sign KA25).

[5] *See* Exhibit A for a list of available Inmarsat land-based BGAN terminals.

that provides the world's fastest mobile video streaming by satellite, and it launched that service in 2009.[6] Just three months ago, in June 2010, Inmarsat further improved its service offerings by introducing its world-wide GSPS,[7] which supports communications over handheld handsets almost anywhere in the world.

Most recently, Inmarsat announced its latest commitment to meet the growing needs of its customers. Inmarsat has signed a contract with Boeing for the design, construction and delivery of three state-of-the-art Ka-band satellites that will be capable of delivering service at speeds of up to 50 Mbps.[8] These new satellites are being optimized to provide a global high-speed broadband service, called *Global Xpress*, that will address the growing needs for VSAT services in the maritime, energy and government sectors, as well as serve the evolving needs of the aeronautical sector. The services provided over this Ka-band network will complement Inmarsat's existing global L-band services, providing consumers with unprecedented levels of resilience and reliability in remote and harsh environments, as well as the speeds that are needed to support tomorrow's broadband applications.

II. SPECIFIC PROPOSALS IN THE *NOTICE OF PROPOSED RULEMAKING*

A. New Co-Primary 2 GHz Band Allocations

In the *Notice*, the Commission proposes to add co-primary Fixed and Mobile allocations to the 2 GHz band, with the stated goal of providing greater flexibility to offer

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6 *See* Inmarsat News, *BGAN X-Stream Delivers Fastest Video Streaming* (Apr. 20, 2009), *available at* http://www.inmarsat.com/Services/Land/News/00024923.aspx (announcing launch of BGAN X-Stream service offering video streaming rates of up to 450 kbps).

7 *See* Inmarsat News, *Inmarsat Launches Its First Global Handheld, IsatPhone Pro* (June 15, 2010), *available at* http://www.inmarsat.com/About/Newsroom/00032284.aspx?language=EN&textonly=False (announcing rugged satellite phone with highly competitive pricing and performance).

8 *See* Inmarsat News, *Inmarsat to Invest US$1.2Bn in Ka-Band Network* (Aug. 6, 2010), *available at* http://www.inmarsat.com/About/Newsroom/00036138.aspx?language=EN&textonly=False.

terrestrial service in the band.[9] Inmarsat takes no position with respect to adding these allocations to the 2 GHz band in the United States, but notes that MSS spectrum is coordinated regionally and globally, and thus any modifications that might be made to the 2 GHz band must be applied solely to that band and exclusively in the United States. Inmarsat also agrees that any changes should be limited to the 2 GHz band, as proposed in the *Notice*, and emphasizes that the Commission should not change the current allocations in the 1.5/1.6 MHz portion of the L band. As described throughout these comments, the L band is heavily used by MSS customers, in many cases performing critical missions, and any modification of the current allocations in that band could create unacceptable risks to these users.

The Commission also proposes not to assign any 2 GHz spectrum that may be returned from the existing MSS licensees, either through cancellation or surrender of their licenses, to other MSS licensees.[10] Inmarsat was an applicant to provide service in the 2 GHz MSS band,[11] and currently has a petition for reconsideration pending with respect to the decision that awarded the entire 2 GHz band to the current licensees, instead of allowing new entrants in the band.[12] As the Commission is well aware, globally harmonized spectrum, including portions of the 2 GHz MSS allocation, is very difficult to achieve. Global harmonization requires international agreement, usually at one or more World Radiocommunication Conferences, along with several years of study and negotiations. It

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9 *Notice* at ¶ 10.

10 *Id.* at ¶ 15.

11 *See Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands*, Order, 20 FCC Rcd 19696 (2005); *Inmarsat Global Limited, Petition for Declaratory Ruling to Provide Mobile Satellite Service to the United States Using the 2 GHz and Extended Ku-Bands*, Order, 20 FCC Rcd 19409 (2005).

12 *Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands; Inmarsat Global Limited Petition for Declaratory Ruling to Provide Mobile Satellite Service to the United States Using the 2 GHz and Extended Ku-Bands*, Consolidated Petition for Reconsideration of Inmarsat Ventures Ltd. And Inmarsat Global Ltd., IB Docket Nos. 05-220, 05-221 (filed Jan. 9, 2006).

would be unfortunate to lose this nearly unique allocation in the United States, especially for the portion of the band that is globally harmonized. Moreover, as detailed below, the 2 GHz band is a critical component of future telecommunications network planning in the European Union.[13]

If the current MSS licensees are unable to develop a commercial service in the 2 GHz MSS band, it does not mean that other MSS operators are incapable of using the band to offer valuable satellite services to the public. If the Commission does reclaim the licenses from the existing 2 GHz licensees, Inmarsat believes that the Commission should consider making the 2 GHz band available to other MSS operators, and not foreclose MSS operators from utilizing a globally harmonized MSS band to provide mobile services in and around the United States.

In the *Notice*, the Commission suggests that there could be substantial delays in any terrestrial deployment at 2 GHz by other satellite operators because of the preconditions to ATC deployment.[14] Inmarsat does not agree with the Commission's analysis on this point. For example, it is possible that a future 2 GHz MSS licensee could provide service using the existing 2 GHz satellites that have already been deployed by the current licensees.

B. Application of the *Secondary Markets* Framework to MSS

In the *Notice*, the Commission proposes to permit MSS operators to lease their spectrum to third parties for ATC purposes pursuant to leasing policies made applicable to terrestrial wireless radio services through the Commission's *Secondary Markets* framework.[15] The Commission explains that this proposal is intended to "provide greater regulatory

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13 *See* Section III.E, *infra* (discussing the 2 GHz band approach in the European Union, where Inmarsat has been granted a spectrum award).

14 *Notice* at ¶ 15 n.53.

15 *Id.* at ¶ 17.

predictability and parity, so that a common set of policies and rules applies for spectrum leasing arrangements involving the provision of terrestrial services, independent of the underlying allocation."[16]

Inmarsat appreciates the Commission's efforts to facilitate the flexible use of MSS spectrum for ATC purposes in order to further the goals of the National Broadband Plan. By facilitating spectrum lease arrangements, the Commission would facilitate the ability of MSS operators to deploy ATC. Certainly, such arrangements have the potential to advance the public interest, particularly through the increased availability of terrestrial broadband services.

At the same time, Inmarsat notes that the proposal to apply the *Secondary Markets* framework to the MSS context is unclear in certain respects. Much of this uncertainty arises from the fact that this framework was designed around assumptions specific to the terrestrial wireless context. In translating the *Secondary Markets* framework to the MSS context, the Commission should be careful to consider and address issues unique to the terrestrial use of MSS spectrum.

First and foremost, the Commission should make clear that the ability of licensees to enter into spectrum leases would not permit them to circumvent existing ATC rules and requirements. The Commission suggests as much in the *Notice*, but a more explicit statement would ensure that licensees and lessees are clear as to their continuing obligations.[17] Notably, such clarification would be consistent with the Commission's pledge in the *Secondary Markets First Report and Order* not to allow its leasing rules to "be used as

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16 *Id.*

17 *Cf. id.* at ¶ 13 n.51 ("We note specifically that fixed and mobile stations operating in the 2 GHz Band must comply with existing MSS ATC service rules specified in 47 C.F.R. [§] 25.252."); *id.* at ¶ 22 n.72 (noting that "the secondary market policies and rules do not alter the underlying service rules and policies that apply to the licensee and, in turn, the spectrum lessee").

a means to undermine the service rules and general policies applicable to particular licenses."[18]

Among the most significant components of the Commission's ATC rules are the "gating criteria" applicable to ATC licensees. Specifically, an MSS licensee wishing to conduct ATC operations must: (i) operate an MSS system capable of satisfying minimum geographic coverage requirements; (ii) maintain spare satellites to ensure the ability to provide satellite services on a continuous basis; (iii) provide commercial satellite service throughout the relevant coverage area; (iv) offer an integrated MSS/ATC service to the public; and (v) provide ATC services only within spectrum assigned to the licensee for MSS use.[19] These requirements are intended to ensure that operators continue to provide substantial satellite service using MSS spectrum, and that terrestrial service, if any, truly is ancillary to the substantial MSS service. The Commission has explained that a licensee's failure to satisfy the ATC gating criteria would undermine the integrity of MSS operations, such that terrestrial use of MSS spectrum should not be permitted.[20]

In light of these and other existing rules and policies, the Commission should not simply translate the *Secondary Markets* framework to the MSS context wholesale, as doing so could unintentionally permit licensees to create interference, and thus harm the public interest. For example, an MSS operator could attempt to circumvent the gating criteria entirely by leasing spectrum to a third-party operator providing terrestrial service who may

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18 *See Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Report and Order, 18 FCC Rcd 20604, at ¶ 91 (2003) ("*Secondary Markets First Report and Order*"); *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 17503 (2004).

19 *See* 47 C.F.R. § 25.149(b).

20 *See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, Report and Order, 18 FCC Rcd 1962, at ¶ 66 (2003).

not have the incentive or ability to manage interference effectively. The Commission can and should avoid this result—which would be contrary to the intent of the *Notice* and the *Secondary Markets First Report and Order*—by making targeted changes to its existing spectrum leasing policies to restrict the types of leasing arrangements that would be permissible in the MSS context. For example, the Commission could allow only "spectrum manager" leases, instead of "*de facto* transfer" leases, thereby ensuring that MSS operators retain ultimate control over the use of MSS spectrum, enhancing their ability to coordinate operations with ATC uses and avoid harmful interference.[21] The Commission also should clarify that *Secondary Markets* leases involving ATC uses are permissible only after the MSS operator, either independently or together with its potential lessee(s), has demonstrated how it would satisfy the relevant gating criteria (since MSS spectrum would not otherwise be available to lease for terrestrial purposes in the first place).

III. THE *NOTICE OF INQUIRY* AND POTENTIAL MEASURES TO MAXIMIZE BENEFITS FROM THE USE OF MSS SPECTRUM

A. Any Evaluation of Potential Changes to MSS Spectrum Policy Should Consider the Numerous Qualitative Public Interest Benefits Derived from MSS Operations

In addition to the specific proposals set forth in the *Notice of Proposed Rulemaking*, in the accompanying *Notice of Inquiry* the Commission seeks comment as to what measures it might take to "help ensure that the public receives the maximum benefits from the use of [MSS] spectrum."[22] Inmarsat agrees that this must be a central question as the Commission crafts regulatory policy affecting the MSS bands. In evaluating various policy options, the Commission should take a broad view that considers both the quantitative and qualitative benefits derived from the availability of MSS in a given band.

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21 *See Notice* at ¶ 24.

22 *Id.* at ¶ 31.

As the Commission has specifically recognized, satellites are: (i) capable of providing truly ubiquitous coverage, from the densest urban cores to the most rural areas, which may be beyond the reach of terrestrial wireline or wireless networks; (ii) located thousands of miles above the earth, rendering the network substantially less susceptible to ground-based disasters than terrestrial networks; (iii) capable of providing broadband video service, in addition to voice and data services; (iv) capable of dynamically reassigning spectrum resources to those geographic areas most in need of communications capabilities; and (v) capable of facilitating interoperability given their nationwide coverage.[23] In addition, MSS operators provide service using a cost structure that is distance-insensitive. Consequently, rural and remote areas are served in the same efficient manner, and with the same "last-mile" cost, as more populated regions.

In short, satellites currently provide critical services and capabilities to users who could not otherwise access those services and capabilities—including users in the maritime, aviation, military, public safety, media, energy, and farming sectors. This is borne out by Inmarsat's own experience, which is detailed below. Even where MSS is not widely used, its availability provides essential back-up capacity, expands consumer choice, and places competitive pressure on terrestrial providers. The Commission should weigh these public interest benefits as it evaluates potential "maximum benefits" from the use of MSS spectrum.

B. The L Band is Ideally Suited to Deliver "Maximum Benefits"

MSS has been a core service provided in the L band (1525-1559 MHz and 1626.5-1660.5 MHz) for over 30 years. This band has been globally harmonized, allowing users the ability to operate around the world with the same user terminals. The excellent

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[23] *See Recommendations of the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks*, Order, 22 FCC Rcd 10541 (2007); Comments of the Satellite Industry Association, EB Docket No. 06-119 (filed Aug. 7, 2006).

propagation characteristics of the L band permit use of omni- and directional antennas on mobile platforms, in difficult terrain, and during severe weather. Because the Inmarsat user base is inherently mobile, whether at sea, in the air, or on land, many of the terminals are on platforms like ships or aircraft that continuously move around the globe. Having access to a network that works anywhere is essential to these users. Because of the large number of global users relying on MSS in the L band, Inmarsat, its service providers, and end users have adapted MSS for critical applications in a multitude of environments (*e.g.*, public safety and disaster response operations) to take full advantage of the benefits of the services offered in the band. As a result of this success, the demand for global L-band MSS continues to grow.

Consistent with the global harmonization of the L band, Inmarsat and many other MSS operators from other countries and regions share access to L-band spectrum. In a sharing arrangement that is unique to this band, operators and their administrations meet periodically to assess the spectrum requirements for each MSS system based on previous and anticipated demand. This coordination process is governed by procedures developed over many years through the International Telecommunication Union, at World Radiocommunication Conferences, and in multilateral negotiations.[24] Inmarsat has worked hard to ensure that MSS spectrum remains available around the globe to satisfy the requirements of its customers.

During the many years that L-band MSS has been deployed, the number of active terminals has continued to steadily grow. Advancing satellite and ground network technologies allow for smaller, more portable terminals than ever before. The market for MSS has grown as terminals become easier to use and transport, and provide higher speeds and more services. Today, the Inmarsat L-band network is one of a number of avenues of global communications that is available to customers who seek connectivity on the go.

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[24] *See*, Section III.D, *infra* (describing international L-band coordination process).

C. Inmarsat Currently Provides a Rich Array of Services in the L Band

Inmarsat's long and productive operational history demonstrates both the public interest benefits of MSS operations generally, and the value of the L band specifically.[25] During Inmarsat's three decades of service to the global community, Inmarsat has offered at least 21 different types of service at sea, in the air, and on land.[26] Inmarsat's legacy services include safety of life services for maritime and aeronautical customers and capacity that is used by government customers for a variety of critical needs. As noted above, Inmarsat's newer services, introduced in the last five years, include BGAN, SwiftBroadband, FleetBroadband, and GSPS. All of these services are available around the globe, including in the most remote and hard-to-serve areas. The following are some examples of the types of services and users that rely on Inmarsat's networks for "routine" mission critical communications.

(i) Inmarsat's Provision of Critical Service Capabilities

Inmarsat's BGAN terminals are used in the United States by many U.S. Government entities, including FEMA, the National Guard, the U.S. military, state and local governments, law enforcement personnel, and critical industries such as mining and gas, to facilitate broadband Internet access and voice communications in all areas of the country, including where and when terrestrial networks are degraded or unavailable. With the higher data-rate capabilities and smaller, easier to use mobile terminals afforded by BGAN, first

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25 Inmarsat was founded in 1979 as the International Maritime Satellite Organization (Inmarsat), a not-for-profit international organization set up at the request of the International Maritime Organization, a United Nations inter-governmental organization. Inmarsat was established for the purpose of creating a satellite communications network for the maritime community. The name was eventually changed to the International Mobile Satellite Organization to recognize the expansion of service to include aeronautical and land mobile services. Inmarsat was privatized in 1999 and continues to serve the maritime, aeronautical and land mobile communities as a fully commercialized company listed on the London Stock Exchange.

26 *See* Exhibit A.

responders and private industry around the world have available a robust and quickly deployable communications alternative for routine use in hard-to-reach areas, or when the next natural disaster or other domestic crisis occurs and immediate connectivity is needed. Many of these users rely on the Inmarsat network for mission critical communications.

Maritime. Inmarsat plays an integral role in the lives of seafarers. When it comes to delivering reliable maritime communications and safety services, no other network can match the global reach and breadth of Inmarsat services. Many modern commercial vessels require highly efficient operation and management along with the need to meet the safety requirements of the Global Maritime Distress Safety System ("GMDSS") developed by the International Maritime Organization, a United Nations agency. Commercial vessels have successfully used Inmarsat service to repel and warn about pirates who have tried to mount attacks around the world.[27] Inmarsat also provides critical communications to the fishing industry, allowing for sophisticated fish-finding techniques as well as enabling e-commerce. For example, Inmarsat service is used to transmit catch photos to shore to enable real-time, Internet-based bidding on the latest catch, while still at sea, and regardless of weather conditions.

Aviation. Over 8,000 aircraft rely on Inmarsat for their global in-flight connectivity needs. Inmarsat is the most widely used satellite operator in the industry, and was the first operator to provide global safety services that comply with the requirements of the International Civil Aviation Organization ("ICAO"), a United Nations agency. A single Inmarsat equipment installation enables a diverse range of applications for both the cockpit and the cabin—including safety communications, weather and flight-plan updates, access to the most fuel-efficient oceanic flight paths, transmissions of aircraft position, maintenance status for ground crews, and email, Internet and voices services. Outside the United States,

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[27] *See* Inmarsat News, *Pirates Thwarted Thanks to Inmarsat C* (Feb. 13, 2009), *available at* http://www.inmarsat.com/Services/Maritime/News/00024647.aspx.

22 international airlines offer mobile phone service on their aircraft to passengers in the cabin using Inmarsat services for the link to the ground. Every month approximately 20,000 commercial flights offer in-flight mobile phone service to over 280 destinations in 72 nations, serving over two million passengers.[28]

Military. Inmarsat also provides critical global communications services to heads of state, including the President of the United States on Air Force One, as well as to military commanders in transit and at the scene of operations. Inmarsat provides reliable and secure access to command, control and information resources for leaders in the United States and around the world, no matter whether they are on land, sea or in the air.[29] On all these platforms Inmarsat mobile satellite service offers secure communications to permit leaders to communicate via email, Internet, file transfers, and videoconferencing**.** Applications offered over Inmarsat's service also include remote access to headquarters networks, weather and map updates, remote diagnostics, safety and back-up communications, as well as welfare and telemedicine communications. Inmarsat's network also supports Blue Force Tracking for

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[28] *See* Letter from Panasonic Avionics Corporation, Thales Avionics, Inc., the Satellite Industries Association, Tech America, Inmarsat, Inc., TIA, the Small Business & Entrepreneurship Council, the Consumer Electronics Association, Row 44, Inc., Hughes Network Systems, LLC, MTN Satellite Communications, T-Mobile, CTIA-The Wireless Association, the Inflight Passenger Communications Coalition, and the Voice on the Net Coalition to The Honorable John D. Rockefeller, Chairman, Commerce, Science & Transportation Committee, U.S. Senate (Aug. 17, 2010); Letter from the Consumer Electronics Association, CTIA-The Wireless Association, the Satellite Industry Association, Tech America, Inmarsat, Inc., and the Telecommunications Industry Association to The Honorable John D. Rockefeller, Chairman, Commerce, Science & Transportation Committee, U.S. Senate, and The Honorable Kay Bailey Hutchison, Ranking Member, Commerce, Science, & Transportation Committee, U.S. Senate (Apr. 28, 2010), *available at* http://www.passengercommunications.com/_pdf/Group_Letter_Rockefeller_Hutchison.pdf.

[29] Applications include multi-channel, high-quality telephony, messaging, email, Internet and government network access, safety communications, large file transfer (still images, audio and video), videoconferencing, telemedicine, STU, STE and the latest NSA type-1 encrypted communications, and real-time air-ground collaboration.

NATO militaries and mobile command post communications support. In addition, Inmarsat also provides redundant voice and data services for sensitive diplomatic traffic.

Public Safety. BGAN service is now a critical broadband communications tool for U.S. Government, first responders, industry and media in the United States. BGAN is transforming public safety communications with a compelling combination of voice and high-speed data, that is independent of terrestrial networks. BGAN provides communications operability from the first moment of a disaster response, even when terrestrial networks are disrupted, as well as in areas where they are unavailable. BGAN also provides interoperability for first responders as they enter disaster or emergency areas with different communications devices. For example, BGAN technology is being used to create ad hoc networks by providing instant IP data and voice backhaul for pico-cells and land mobile radio extensions.

First responder and public safety applications of BGAN include: (i) broadband mobile command post (email, Internet, VPN, telephony); (ii) connectivity between individual first responders, mobile command posts and off-site leadership, including using standard HF radios and cell phones; (iii) fixed or vehicular mobile command posts that support multiple users from a single device via a WLAN; and (iv) situational awareness using live video from isolated sites. Inmarsat's BGAN communications technology is currently deployed throughout the United States for the uses described above by public safety and first responder communities. The following table lists specific examples of current BGAN use by well-known organizations:

Use	Selected Customers
Continuity of Government	New York Fire and Police Departments
	New Orleans Police Department
	Florida National Guard
Large Scale Disaster Response	Federal Emergency Management Agency (FEMA)
	Urban Search & Rescue teams: California, Massachusetts
Live Video Surveillance	DHS/U.S. Border Patrol
Boarding Teams; Harbor Patrols	DHS/U.S. Coast Guard
Wildfire Suppression	CalFire/U.S. Forest Service/Los Angeles County
Public Health	Emergency communications for Louisiana hospital system
	Kentucky Department of Public Health Pandemic Response teams

Media. Inmarsat provides essential communications services to major U.S. and international media organizations. Because of its small size, yet high bandwidth voice and data capabilities, BGAN is ideal for rapid deployment and easy set up and operation by non-technical personnel all over the world. Examples of recent use of BGAN by major customers include reports filed from disaster areas, such as Haiti, war zones, such as Afghanistan and Iraq, and sports events, like the World Cup and the Olympics. Inmarsat's network has been customized to meet the various demands of broadcasters including for live broadcasting (384 kbps up to 450 kbps), store and forward video footage, print/photo journalism reports directly from the field, and remote news bureau connectivity for temporary communications to permit journalists to use the same applications that they would have access to in the newsroom.

Energy. The energy extraction sector, including mining, gas and oil, and related construction projects, have historically been core customer segments for Inmarsat on land and at sea. The global satellite coverage, compact terminal sizes, and voice, data, and video options available on the Inmarsat networks provide the energy industry with the robust communications necessary for remote, safety-intensive operations in very harsh operating

environments. Inmarsat has continued to innovate in this field to meet the needs of customers for greater automation of remote activities (*e.g.*, SCADA, machine-to-machine, and other low-data-rate services).

Inmarsat's BGAN product provides instant, on-site voice and high-speed data connectivity for remote teams allowing them to send back test results, still images and video to the home base for immediate analysis and consultation—helping to improve exploration efficiency and reduce find-times. BGAN also allows for reduction of travel costs, control of project progress and information, improved supplier management, enhanced decision-making speed and accuracy, and reduced well and pipeline downtime, and also helps ensure compliance with health and safety requirements.

Inmarsat's products also provide similar capabilities for all stages of the mining cycle, from mineral extraction through to mine closure. Exploration teams can send test data, still images and video to geophysicists back in the lab for immediate analysis and results, wherever they are working, increasing the success rate of exploration leading to faster exploitation of new deposits. Similarly, Inmarsat's products are used in the construction industry to provide site managers with the ability to send progress reports, still images and video back to the head office directly from the construction site, reducing completion times.

Farming. Deere & Company ("Deere") has been using Inmarsat satellite communications networks for over a decade to provide farmers with a precision farming system. The GreenStar™ system employs receive-only vehicle mounted StarFire™ mobile earth stations. These earth stations receive L-band signals from the Inmarsat 4F3 satellite and provide correctional data which enhances the information the system receives from Global Positioning Satellites ("GPS"). The positioning capability of this system was developed originally to assist farmers in comparing the crop yields from various fields to determine, among other things, the amount of fertilizer and seed appropriate for a particular field and

crop. It has now found additional important uses to improve farming efficiency, including enabling farmers to manually record observations such as weed patches, crop appearance, and other field variables. In addition, when coupled with the farm vehicle steering system through the Deere AutoTrack system, this Inmarsat-based service aids the operator with steering to reduce repeated passes over the same track, thus reducing crop and soil damage and increasing fuel efficiency.[30]

(ii) Inmarsat's Support of Nascent Applications

In addition to the traditional MSS offerings discussed above, Inmarsat has continuously worked to develop new technologies, and identify new applications of those technologies. These applications represent not only exciting growth potential for the company, but also serve as a vivid reminder of the potential of MSS.

Rural Healthcare. Inmarsat provides reliable and secure access to broadband information resources for health care providers in the United States and around the world, no matter whether they are on land, at sea, or in the air.[31] In particular, Inmarsat's BGAN technology offers a unique solution for health care delivery, leveraging the capabilities of MSS across the national (and global) footprints of Inmarsat's satellites.[32] Inmarsat and its partners are constantly investigating opportunities to expand the application of MSS technologies for use in healthcare settings.

While Inmarsat's unique mobile satellite communications technology has been available worldwide only for a relatively short time, service providers and end users are

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30 *See* IBFS File No. SES-STA-20090807-00976, Exhibit A.

31 Applications include multi-channel, high-quality telephony, messaging, email, Internet and government network access, safety communications, large file transfer (still images, audio and video), videoconferencing, telemedicine, STU-III encrypted communications, and real-time air-ground collaboration.

32 *See* Exhibit B, showing Inmarsat's three I-4 satellite footprints and spot beams for the United States and the rest of the world. The global availability of Inmarsat's BGAN service means that equipment purchased in the United States can also be taken and used anywhere in the world.

actively exploring how best to use the technology for health care delivery. For example, BGAN technology is currently being deployed in: (i) ambulances to facilitate lifesaving procedures in the field or "on the move;" (ii) mobile clinics to deliver primary and specialty care in rural communities; and (iii) hospices and homecare settings to provide access to electronic medical records and support.

Other potential uses of Inmarsat services are currently being developed and tested for mobile health clinics and rural homecare services. With respect to mobile health clinic applications, Inmarsat is partnering with health care providers and organizations to improve primary care services by investigating opportunities for: (i) portable or vehicular BGAN to help deliver basic healthcare services in underserved, rural or other hard-to-reach communities; (ii) basic voice and data connectivity for patient communications and online access to medical records; (iii) real-time transmission of diagnostic tests and live, interactive consultation with specialists and other medical staff; and (iv) location-based services to improve health care personnel security and time management.

BGAN is also an extremely valuable form of connectivity in time-critical, lifesaving emergency response situations. BGAN can facilitate seamless and ubiquitous mobile connectivity in ambulances as back-up to cellular data services in terrestrially covered areas, or as a primary form of connectivity in remote locations. Today, uninterrupted mobile broadband access is critical because ambulances are essentially mobile emergency rooms requiring reliable connectivity for monitoring diagnostics, real-time video consultation, and remote procedures. BGAN also provides a fail-safe and seamless solution for first responders and health care professionals when cellular networks are out of reach.

BGAN is also being evaluated as a backhaul link for portable telemedicine response kits. These kits, which can be easily deployed for emergency response, disaster relief, or search and rescue, consist of portable examination kits that permit transmission of

diagnostic data to fixed sites for higher level evaluation. Kits can also include voice and video capabilities allowing live, real-time support for emergency treatment. In many situations, enhanced field care minimizes the need for medical evacuations and, ultimately, costs.

Smart Grid. Satellite networking technology will also play a critical role in Smart Grid efforts for the utility industry. Recently, Inmarsat filed joint comments with Hughes Network Systems, LLC ("Hughes") in the Department of Energy's ("DOE") Request for Information on implementation of the Commission's National Broadband Plan.[33] In those comments, Inmarsat and Hughes explained the benefits and important role of satellite communications technologies for Federal Smart Grid policy.

Inmarsat and Hughes agreed with DOE that "[o]ne of the key technology areas of the Smart Grid is integrated two-way communications, which make the Smart Grid a dynamic, interactive, real-time infrastructure."[34] Communications requirements "will be a critical component of both the Smart Grid and the other technologies that will evolve and change how electricity is produced, consumed, conserved and distributed."[35] Therefore, an effective Smart Grid depends on a robust network and communications infrastructure. The requirements of the communications network that must be considered are scalable bandwidth, robust security, high network reliability and availability, and cost-effectiveness.

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33 *See Implementing the National Broadband Plan by Studying the Communications Requirements of Electric Utilities to Inform Federal Smart Grid Policy*, Comments of Hughes Network Systems, LLC and Inmarsat Inc., Docket ID: DOE-HQ-2009-0003-0819 (filed July 12, 2010) ("Hughes/Inmarsat Smart Grid Comments") (filed in response to *See Implementing the National Broadband Plan by Studying the Communications Requirements of Electric Utilities to Inform Federal Smart Grid Policy*, Request for Information, 75 Fed. Reg. 26,206 (May 11, 2010) ("*Smart Grid RFI*")).

34 *Id.* at 4 (quoting *Smart Grid RFI*, 75 Fed. Reg. at 26,207).

35 *Id.*

As Inmarsat and Hughes explained, the most pragmatic approach to meet these requirements is to leverage the wide range of transport technologies available while relying on common open standards, such as the Internet Protocol ("IP") standard, to integrate into a single, overall network architecture. As many commenters noted in the public comment process for the Commission's National Broadband Plan, Smart Grid is platform-agnostic and a wide variety of broadband platforms may be employed (*e.g.*, wireless, wireline, satellite), but a common open standard such as the IP standard should be used for the end-to-end network layer. Using the IP standard will allow the Smart Grid network to be interoperable and multiple smart grid applications to work in a collaborative and unified manner.[36]

Inmarsat and Hughes agreed with DOE's recognition that satellite is one of "many communications and networking technologies that can be used in Smart Grid applications . . . ."[37] Very high network availability, in excess of 99.99 percent, can be achieved through innovative dual frequency, dual access solutions by utilizing Ku- or Ka-band satellite service in conjunction with L-band satellite service as a primary or backup communications path. Smart Grid network elements, such as remote substations and distribution elements, can now be connected using satellite without compromising on the expected benefits driving the Smart Grid. When combined with high performance IP and other standards-based capabilities, satellite networks today deliver high-quality, secure, broadband connectivity.

Satellite has an important role for Smart Grid applications because it can be used for substation connectivity, distribution automation, advanced metering infrastructure

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[36] Comments of Alcatel-Lucent, GN Docket Nos. 09-47, 09-51, 09-137, at ii (Oct. 2, 2009) (NBP Public Notice #2); Comments of AT&T, GN Docket Nos. 09-47, 09-51, 09-137, at 6 (Oct. 2, 2009) (NBP Public Notice #2).

[37] Hughes/Inmarsat Smart Grid Comments at 5 (quoting *Smart Grid RFI*, 75 Fed. Reg. at 26,207).

("AMI"), mobile work force and disaster recovery.[38] In any case, satellite solutions are an essential part of the multi-technology approach required by the utility industry to achieve an end-to-end, smart grid communications infrastructure—one that is reliable, fast, secure, and cost-efficient.

Disaster Relief. On January 12, 2010 the earthquake that crippled Haiti also devastated most of its communication infrastructure, and overloaded the limited terrestrial communications that remained available. On February 27, 2010, the earthquake that struck Chile again knocked out terrestrial communications infrastructures. Similarly, floods in Pakistan during August 2010 destroyed critical terrestrial telecommunications and power infrastructure, leaving many without the ability to contact their loved ones. These events, and others, have had a significant impact on the ability of governments and organizations to provide assistance and relief.

Each such event also demonstrated Inmarsat's ability to provide services critical to rescue and recovery efforts. For example, immediately after the Haiti earthquake, Inmarsat's mobile satellite communications services were deployed to support emergency relief efforts. Télécoms Sans Frontières ("TSF") dispatched a team equipped with Inmarsat mobile voice and broadband terminals. The TSF teams used Inmarsat BGAN and Mini-M equipment to provide essential communications services—a critical requirement for coordinating the early stages of the response—for the United Nations Office for the Coordination of Humanitarian Affairs ("OCHA") and other NGOs assisting with relief efforts. TSF also provided communications for the local population, enabling them to call family and loved ones. Inmarsat provided additional support to government and NGO users in the region, including the United Nations, World Vision, and American first responders and

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[38] *See generally* Hughes/Inmarsat Smart Grid Comments (presenting detailed information on specific Smart Grid solutions being deployed by Hughes using the Inmarsat MSS network).

militaries that joined the relief efforts. The ability of the Inmarsat-4 satellites to dynamically reallocate spot beams to areas of high demand, as well as share resources with LightSquared (formerly SkyTerra), helped ensure that vital communications services were available to essential government and aid operations in the region.

Inmarsat services are also being used by TSF teams deployed in Pakistan following intense flooding that claimed the lives of thousands. These teams have provided information and communications technology support at the United Nation's emergency coordination center, which has assisted in joint rescue and recovery operations. They also have provided humanitarian calling for over 10,000 families trying to contact friends and relatives.[39] Inmarsat BGAN services were deployed in the Gulf of Mexico region to assist in the massive cleanup efforts resulting from the oil spill. BGAN has been used to communicate vital geographic information system ("GIS") data using partner ESRI's field data capture software to map oil barricades including sand levees and booms in remote locations along the Gulf Coast in cooperation with the National Guard, U.S. Coast Guard, and U.S. Fish and Wild Life Response Teams.[40]

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[39] *See* Télécoms Sans Frontières, *Floods in Pakistan: TSF On Site to Support Emergency Efforts* (last visited Sept. 14, 2010), *available at* http://www.tsfi.org/en/action/emergencies/129-inondations-au-pakistan-tsf-a-deploye-une-premiere-equipe; Inmarsat News, *TSF Call Centres Offer Lifeline to Pakistan Flood Victims* (Aug. 27, 2010), *available at* http://www.inmarsat.com/About/Newsroom/00036441.aspx?language=EN&textonly=False (reporting TSF's team visits to more than 80 locations throughout Khyber Pakhtunkhwa province to offer free overseas and in-country calls to over 2,000 people sheltering in schools and temporary camps); Inmarsat News, *TSF Supports UN Disaster Co-ordination Centre in Pakistan* (Aug. 23, 2010), *available at* http://www.inmarsat.com/About/Newsroom/00036436.aspx?language=EN&textonly=False (explaining TSF's provision of support at United Nation's emergency coordination center in Multan district in Punjab province, where the agency's disaster and assessment coordination teams and various non-governmental organizations ("NGOs") are based).

[40] *See* Inmarsat News, *Gulf of Mexico Oil Spill: BGAN Plugs Comms Hole* (June 11, 2010), *available at* http://www.inmarsat.com/About/Newsroom/00032280.aspx; *ESRI Teams with Inmarsat to Assist Gulf Oil Spill Cleanup*, SPACE NEWS, Aug. 9, 2010, at 17.

(iii) Inmarsat's Provision of Rural and Remote Low-Cost Telephony and Data Services

Inmarsat, its distribution partners, manufacturing partners and customers have all worked closely together over the years to develop network and terminal features that meet the demanding requirements of end users. Two such products are the recently introduced GSPS and the more established but quickly evolving Satellite Low Data Rate ("SLDR") products. These products both provide low cost, global forms of communication in remote and harsh environments, often where no other form of communication is available. GSPS provides voice and SMS capabilities to a user handset. SLDR provides data bursts at regular intervals for machine-to-machine and other similar information paths. As explained above, these products were introduced primarily as a result of customer needs and a desire by Inmarsat to be able to provide a full suite of solutions to meet its customers' unique communications requirements. This style of innovation at Inmarsat and throughout its distribution channel continues today as new products are constantly evaluated for possible introduction into the Inmarsat family.

D. New, Higher-Speed MSS Products Will Intensify Further the Need for MSS Spectrum

Increasing levels of competition from fixed satellite service ("FSS") providers, as well as the growing demand for bandwidth-intensive MSS services, have placed significant demands on L-band spectrum and have required that Inmarsat work hard to ensure that its customers have adequate spectrum to support the critical functions that they have long provided, as well as the new bandwidth-intensive functions they are capable of providing. Specifically, Inmarsat needs adequate spectrum to support the growing demand for multimedia and graphics-rich services that have become commonplace for business, educational, health care and governmental applications alike, and are becoming increasingly

important to users such as first responders and those who work or travel in rural and remote areas.[41]

As noted above, Inmarsat currently provides MSS in the L band, which is globally-harmonized spectrum that is shared around the world by over twenty spacecraft and ten operators, under unique "market-based" spectrum sharing arrangements that have not been used in any other satellite band. Different multilateral L-band sharing arrangements govern: (i) Europe, Asia, and Africa (Regions 1 and 3) and (ii) the Americas (Region 2). Each of these sharing arrangements is designed to periodically reassign L-band spectrum among operators according to their demonstrated usage and short-term need.[42] Moreover, because of the way the L band is shared, changes in one part of the world typically need to be coordinated with operators in other parts of the world. Thus, Administrations and satellite operators have mutually established demand-driven mechanisms, under which they are to cooperate in good faith with one another to ensure that additional L-band spectrum can be

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41 Recognizing the need for additional MSS spectrum, the Member States of the International Telecommunication Union participating in the World Radiocommunication Conference ("WRC") 2007 adopted Agenda Item 1.25 ("AI 1.25") to assess the current and projected demand for mobile services. *See Additional Allocations to the Mobile-Satellite Service With Particular Focus on the Bands between 4 GHz and 16 GHz*, WRC Resolution 231 (2007) (calling for studies to identify new bands of MSS spectrum to meet the shortfalls projected in the earth-to-space allocation (of 19-90 MHz) and the space-to-earth allocation (144-257 MHz)); *Traffic Forecasts and Estimated Spectrum Requirements for the Satellite Component of IMT-2000 and Systems Beyond IMT-2000* for the Period 2010 to 2020*, Report ITU-R M.2077 (2006) (concluding that MSS operators will need 155-193 MHz of spectrum by 2010 and 335-519 MHz by 2020). Inmarsat is an active participant in ITU-R Study Group 4's Working Party 4C, which is charged with drafting a final report in response to AI 1.25 that will be delivered at WRC 2012. Like other MSS operators, Inmarsat has consistently expressed its need for additional spectrum to meet the growing needs of its user base. Accordingly, the current draft of the AI 1.25 report calls for the allocation of an additional 240 to 335 MHz of MSS spectrum in the 4-16 GHz bands (in both directions) by 2020. *Traffic Forecasts and Estimated Spectrum Requirements for Future Deployment of the MSS in the Range 4-16 GHz*, Preliminary Draft New Report ITU-R M.[MSS-REQS], Chairman's Report, Annex 13 to Document 4C/522-E (July 21, 2010).

42 *See News Release: FCC Hails Historic Agreement on International Satellite Coordination*, News Report No. IN 96-16 (rel. Jun. 25, 1996).

assigned to MSS operators to support continued growth of their services. L-band spectrum is thus subject to multiple international agreements that affect its use in the United States, as well as elsewhere around the globe.

The North American L-band coordination process takes place under the auspices of a 1996 multilateral agreement that is referred to as the Mexico City Memorandum of Understanding,[43] and bilateral agreements. Five national administrations, the United States, Canada, Mexico, Russia and the United Kingdom, participate in the Mexico City MoU process. Operators of multiple satellite networks from all five countries must work together to coordinate use internationally.

Inmarsat is regularly required to justify its existing L-band spectrum requirements around the world and engage in difficult international negotiations with its competitors in order to ensure it retains sufficient spectrum to support its users' operations. Thus, Inmarsat's L-band usage is subject to a rigorous "marketplace" review that ensures the spectrum is utilized fully and effectively. Inmarsat and other operators and Administrations have devoted significant resources to the process over the years to ensure that users' needs are met. Inmarsat urges the Commission to take into account the challenges associated with this complex international process as part of its evaluation of existing spectrum use. In particular, Inmarsat emphasizes that access to globally-harmonized spectrum is essential for operators who provide global broadband connectivity to critical users worldwide, including those provided today and in the future to public safety, state, and federal government agencies in rural and remote areas and during disasters.[44]

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43 *See Memorandum of Understanding for the Intersystem Coordination of Certain Geostationary Mobile Satellite Systems Operating in the Bands 1525-1544/1545-1559 MHz and 1626.5-1646.5/1646.5-1660.5 MHz*, Mexico City, Mexico, 18 June 1996.

44 *See* Section III.C, *supra* (describing Inmarsat's provision of critical service capabilities).

E. Other Nations Continue to Recognize the Value of MSS and Unified Hybrid MSS/Terrestrial Operations

The *Notice* also seeks comment with respect to the measures that other countries are taking to encourage investment in the MSS bands.[45] In this respect, Inmarsat believes that the experience of the European Union and its Member States in developing a pan-European MSS allocation in the 2 GHz band is relevant to the development of spectrum policy in the United States.

In 2007, the European Commission recognized the public interest benefits that could be derived from the operation of MSS systems. The European Commission noted in particular that MSS systems are able to provide "high speed internet/intranet access, mobile multimedia and public protection and disaster relief" while "improv[ing] coverage of rural areas in the [European] Community, thus bridging the digital divide in terms of geography."[46] In order to realize these benefits, the European Commission adopted far-reaching legislation intended to facilitate the development of a pan-European MSS market.[47] The European Commission's S Band (or 2 GHz Band) process sought to: (i) maximize spectrum efficiency through the use of Complementary Ground Components ("CGCs") (the European equivalent of ATC); (ii) support the use of satellite as a mode of pan-European communications by aggregating spectrum access rights across the entire EU, and (iii) realize public policy objectives related to consumer benefits, public safety and rural connectivity.

The European Commission pursued these objectives by: (i) allocating spectrum for MSS (identifying 2 x 30 MHz of 2 GHz spectrum for MSS on a long term

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45 *Notice* at ¶ 32.

46 European Commission Decision 2007/98/EC, On the Harmonized Use of Radio Spectrum in the 2 GHz Frequency Bands for the Implementation of Systems Providing Mobile Satellite Services, 2007 O.J. (L 43) 32, 32 (Feb. 14, 2007) ("2007/98/EC").

47 European Parliament and Council Decision 626/2008/EC, On the Selection and Authorization of Systems Providing Mobile Satellite Services (MSS), 2008 O.J. (L 172) 15 (June 30, 2008) ("626/2008/EC").

basis);[48] (ii) creating a process through which the European Commission would manage a pan-European competition to identify and select operators able to provide best-of-class MSS systems,[49] and (iii) selecting two operators, Inmarsat and Solaris,[50] each of which was granted spectrum access rights for an 18-year term.[51]

In February 2007, the European Commission identified prime 2 GHz spectrum at 1980-2010 MHz and 2170-2200 MHz for use by MSS operators on a primary, protected basis. The European Commission also permitted this spectrum to be used terrestrially, provided the terrestrial network remained under the control of the satellite operator's spectrum resourcing mechanism, so that terrestrial operations would not cause harmful interference into MSS operations. The European Commission determined that "[u]nder these conditions, subject to an appropriate authorisation regime, CGCs could also be utilised even if signals are not transmitted through the satellite components."[52]

In June 2008, the European Commission adopted 626/2008/EC. This set in place a pan-European Selection and Allocation Process to choose MSS operators that would be granted access rights to portions of the 2 GHz band. Selection criteria sought to identify credible applicants presenting viable MSS systems.[53] Systems were required to meet coverage obligations[54] and demonstrate that progress had already been made in system development against milestones related to satellite construction.

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48 2007/98/EC at 33 (Articles 1, 3).

49 *See* 626/2008/EC.

50 European Commission Decision 2009/449/EC, On the Selection of Operators of Pan-European Systems Providing Mobile Satellite Services (MSS), 2009 O.J. (L 149) 65, 68 (May 13, 2009) ("2009/449/EC") (Article 2). Solaris is a joint venture of SES World Skies and Eutelsat.

51 626/2008/EC at 20 (Article 7:2e).

52 2007/98/EC at 33.

53 *See* 626/2008/EC at 20 (Article 5:1).

54 *Id.* (Article 4:1c).

In May 2009, Inmarsat and Solaris were selected from four applicants, and both were awarded 2 x 15 MHz of 2 GHz spectrum.[55] Each is required to meet "common conditions" for the duration of the award which include the completion of further milestones and the meeting of commitments detailed in the application. Under the terms of the award, European Union Member States are to license the use of CGCs to the selected operators under a limited set of conditions that ensure the provision of substantial satellite service in the band. These include requirements that: (i) the spectrum used by the CGCs be controlled by the "satellite resource and network management mechanism;"[56] and (ii) should the satellite fail, the CGCs should not be operated independently for longer than 18 months.[57]

The United Kingdom's Office of Communications ("Ofcom") published detailed guidance on the use of CGCs and concluded that they had substantial potential to enhance the efficiency of spectrum used by MSS. Ofcom's framework permits the deployment of CGCs with no restrictions on the services that it may carry or the air interface that may be used, nor does it limit the use of CGCs to the mere repeating of the satellite signal.

The European experience confirms the wisdom of the FCC's general approach to ATC licensing, while at the same time suggesting that it is possible to have a more flexible approach to certain gating criteria without undermining the integrity of the MSS bands. First, the European Union has recognized the importance of maintaining a pan-European allocation and assignment for MSS services, analogous to the nationwide MSS allocations and assignments in the United States. In doing so, the European Union has recognized that maintaining an MSS footprint covering all of Europe, while allowing for hybrid

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55 2009/449/EC at 67-68 (Articles 1-3).

56 626/2008/EC at 21 (Article 8:3b).

57 *Id.* (Article 8:3c).

MSS/terrestrial offerings within this allocation, maximizes network efficiency and best serves the public interest.

Second, the European Union has recognized the need to leave control of hybrid operations in the hands of the MSS operator. More specifically, the European Union, like the FCC, has recognized that the MSS operator is in the best position to coordinate joint use of MSS spectrum for satellite and terrestrial operations through a "satellite resource and network management mechanism." Like the FCC, the EU has wisely recognized the technical complexities that could result from *different* operators controlling the satellite and terrestrial components of a hybrid system.

Finally, the experience of the European Union suggests that hybrid MSS/terrestrial operations can be implemented in a way that protects MSS, even with somewhat more flexible gating criteria than were adopted in the United States. At the same time, the European directives recognize the need for certain conditions in order to maintain the integrity of the licensing scheme, and ensure MSS operations are protected. Thus, the European approach suggests that the FCC could relax its gating criteria in certain respects without undermining the integrity of its MSS/ATC licensing framework, and in a manner that is consistent in its emphasis on maintaining substantial MSS service.

F. The Commission Should Exercise Caution with Respect to Measures Intended to Increase "Efficiency" in MSS Bands

The above discussion demonstrates that MSS operators currently are providing a full and vibrant array of valuable services to the public—including users in the maritime, aviation, military, public safety, media, energy, and farming sectors—both in the United States and abroad. Thus, while the 2 GHz band currently may be underutilized by the existing MSS licensees in that band, this should in no way be interpreted as evidence that this will remain the case, or that existing MSS allocations are not needed to serve the public interest. Further, if the Commission does decide to reallocate the 2 GHz band for terrestrial

use, that decision should be limited to the 2 GHz band. In particular, the Commission should take no action impacting existing allocations in the L band, which not only is uniquely suited to support MSS, but currently is relied upon on a daily basis for the critical communications needs of a variety of customers in the public safety, military, maritime, aviation, health care, and energy sectors—among others.

The myriad uses of MSS spectrum today, and the efforts of operators like Inmarsat to provide innovative new services to the public, demonstrate that the Commission need not take radical measures to increase value, utilization, innovation, and investment in the MSS bands.[58] Changes in MSS spectrum policy should be measured, and should seek first and foremost to increase the ability of MSS operators to make efficient use of their spectrum while ensuring that they continue to provide substantial satellite services. Toward this end, the Commission's proposal to permit MSS spectrum leasing arrangements for ATC purposes is a welcome one—although, as noted above, the Commission would need to ensure that such arrangements do not undermine the ability or incentives of operators to provide nationwide (or global, as appropriate) substantial satellite services in MSS spectrum, without risk of interference. Among other things, the Commission should be careful to maintain the integrity of ATC rules and policies, including applicable ATC "gating criteria" (*e.g.*, by allowing only "spectrum manager" leasing arrangements, as detailed above).

The Commission also should consider whether the ATC gating criteria themselves could be relaxed to permit more flexible service arrangements using MSS spectrum, while still maintaining the integrity of MSS operations and protecting against the possibility of harmful interference. The European experience, discussed above, suggests that liberalizing the "integrated service offering" criterion while maintaining some form of the substantial satellite service requirement would maintain the integrity of satellite operations in

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[58] *See Notice* at ¶ 31.

MSS bands. Inmarsat notes, though, that Europe, like the United States, has recognized that the integrity of MSS operations can best be protected by ensuring that the MSS operator retains ultimate control over the use of MSS spectrum for both satellite and terrestrial use throughout the coverage area of the relevant satellite. Inmarsat believes this approach is essential to ensuring that essential MSS operations can be provided without risk of interference.

In addition, the Commission should consider providing MSS operators with greater flexibility with respect to the types of satellite services they may provide. For example, the Commission should consider providing MSS operators with explicit authority to operate terminals at "fixed" points, and still maintain the interference protection afforded by the MSS allocation. In other words, the Commission could deem "fixed" satellite terminal uses of MSS bands to be an application of the MSS. By doing so, the Commission would facilitate the ability of MSS operators to make more efficient, innovative use of their spectrum, while placing additional competitive pressure on FSS operators. Notably, FSS spectrum can increasingly be used to provide mobile and transportable offerings in addition to the traditional fixed services, and mobile uses of FSS bands are deemed an application of the FSS, and are entitled to the same levels of interference protection as FSS uses (as long as they comply with the technical rules that govern the FSS). With spectrum deregulation and advances in antenna technology, FSS providers are able to provide many of the services that once were provided on a broad scale only by MSS providers, and small FSS VSAT terminals in fact are now being deployed on ships and airplanes to provide voice and broadband connectivity to both passengers and crews.[59] There is no reason to deny MSS operators the

[59] *See, e.g., Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service,* Report and Order, 24 FCC Rcd 10414 (2009) (*recon. pending*).

reciprocal ability to provide service to "fixed" points—the traditional focus of FSS—in the same manner that mobile uses have been allowed in FSS bands.

Regardless of whether these measures are implemented, the Commission should recognize that market forces already provide incentives for MSS operators to make efficient use of their spectrum. The Commission should not adopt any measures that would undercut those forces by significantly increasing the costs faced by MSS operators—and consequently draining the resources that they are able to invest in next-generation networks and services. In particular, the imposition of spectrum fees on uses of MSS spectrum would raise operator costs and customer rates significantly, deter capital investment in this capital intensive industry,[60] and distort competition among different service platforms.

The international nature of satellite systems makes spectrum fees particularly problematic, since such fees could negatively impact system viability. Notably, in order to build an economically viable international satellite system and use spectrum efficiently, operators must secure landing rights or other licenses in many countries within their footprint. If the United States were to impose spectrum fees on MSS operators, other countries likely would follow suit, with many favoring their local domestic operators in the process. Thus, the MSS operator could be subject to numerous—and potentially discriminatory—spectrum fees, leading to soaring costs, higher rates, and, ultimately, fewer choices among competing providers.

Thus, any attempt to "tax" MSS operations into greater efficiency by imposing spectrum fees would be counterproductive. In short, the imposition of such fees would undermine the ability of MSS operators to provide critical services, including broadband

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[60] Satellite systems have extremely high up-front infrastructure costs, and unlike terrestrial systems, satellite operators can not generate revenue to cover those costs until their systems are fully deployed. Thus, satellite operators have powerful economic incentives to maximize spectrum efficiency and fully utilize their assigned spectrum quickly so as to recover their upfront investment.

services, to those areas that need these services the most—including remote and rural areas unlikely to be served by terrestrial alternatives.

Critically, the Commission's authority to impose spectrum fees is far from clear. While Congress has given the Commission authority to collect fees to recover the cost of certain regulatory activities,[61] the Commission does not have general taxation authority. Moreover, as the Commission has acknowledged, the ORBIT Act prohibits the Commission from auctioning spectrum used for global or international satellite services.[62] This exclusion was prompted by concerns similar to those expressed by the Commission, particularly the concern that concurrent or successive auctions in the numerous countries in which U.S.-owned global satellite service providers seek licenses "could place significant financial burdens on providers of such services" and thus "threaten the viability and availability of global and international satellite services."[63] Imposing spectrum fees on satellite operators would raise precisely the same concerns, and, if targeted to MSS operators, would represent an impermissible end-run around the prohibition in the ORBIT Act.

IV. CONCLUSION

For the reasons set forth above, Inmarsat respectfully requests that the Commission consider the above comments as it develops its broadband strategy. In particular, the Commission should ensure that it protects the needs and expectations of the numerous MSS users in the L band, which is heavily used, and is especially suited for its current purposes due to its favorable propagation characteristics and a globally-harmonized MSS allocation.

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61 *See* 47 U.S.C. § 159.

62 *See id.* § 765f.

63 *See* H.R. Rep. No. 494, at 64-65 (1998) (Report of Committee on Commerce regarding the Communications Satellite Competition and Privatization Act of 1998).

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Exhibit A

List of Inmarsat Services Provided in L-Band MSS Spectrum

IsatPhone Pro - mobile satellite phone
A lightweight, handheld-size satellite phone, with an easy to use menu and a full range of accessories.

LandPhone - fixed satellite phone
A low-cost, fixed voice service, which can be used indoors or outdoors as a private or business telephone, or as a payphone-type solution in conjunction with prepay cards. Connects to a standard telephone and remote antenna.

Broadband Global Area Network (BGAN)
Delivers simultaneous voice and broadband data communications via a lightweight, notebook-size device. Provides seamless network coverage across most of the world's landmass and offers Standard IP at speeds up to 492kbps and “on-demand” Streaming IP at up to 256kbps.

FleetBroadband 500, 250 and 150
Advanced maritime service designed to provide cost-effective, high-speed data and voice communications, including simultaneous voice and data, Standard IP with speeds of up to 432kbps over a shared channel, ISDN at 64kbps, and streaming data up to 256kbps.

Fleet 77, 55 and 33
These three maritime services offer a combination of global voice and fax communications, Mobile ISDN data at 64kbps and 128kbps, and our original always-on IP-based Mobile Packet Data Service (MPDS) for email, web browsing and other office applications.

FleetPhone - maritime satellite phone
A low-cost phone service ideal for smaller vessels, consisting of below-deck equipment with an integrated voice handset connected to an omni-directional antenna.

SwiftBroadband
Designed to meet the high-speed data communications needs of passengers, cabin crew and pilots in airliners, business jets and government aircraft. Offers a package of simultaneous voice and data, plus contended IP-based data up to 432kbps per channel and 64kbps ISDN.

Swift 64
Provides bandwidth for applications such as high-quality voice, email, internet and intranet access, and videoconferencing, via its Mobile ISDN and IP-based Mobile Packet Data Service (MPDS) offerings.

Inmarsat A
The original Inmarsat service, which was retired at the end of 2007. Based on analog technology, it provided global two-way telephony, facsimile, data and telex communications to the maritime community for a quarter of a century.

Inmarsat B
The first digital successor to Inmarsat A, capable of high-quality telephony, facsimile, data and telex services, and compatible with the Global Maritime Distress and Safety System (GMDSS).

Inmarsat C and Mini C
A digital system based on a low-cost satellite terminal, providing two-way store-and-forward messaging, distress calling, EGC SafetyNET™ and FleetNET™, data reporting and polling. The system is approved for use under the Global Maritime Distress and Safety System (GMDSS) and mandatory for Solas-compliant ships operating outside Navtex coverage areas.

IsatM2M
A two-way burst messaging service enabling a wide range of machine-to-machine applications for tracking and monitoring remote fixed or mobile assets on a global basis—whether on land, at sea or in the air.

Inmarsat D+
The predecessor to IsatM2M. A two-way data communications service that uses very small equipment, with integrated GPS, for data transfer, remote monitoring, tracking and tracing.

Inmarsat M
The first briefcase satphone, introduced in 1993. Also available in the maritime market, as a smaller, digital alternative to Inmarsat B, offering two-way voice telephony, distress alerting, fax and data services at lower data rates.

Mini M
Introduced in 1995, based on digital technology and capable of two-way voice telephony, alerting, fax and data services. Operates only in Inmarsat-3 spot beams, but its notebook size has made it one of the most popular Inmarsat services on land and at sea.

GAN
A precursor to BGAN, the Global Area Network (GAN) service offers high-quality voice, plus a combination of the 64kbps Mobile ISDN and packet-based MPDS data services via a portable terminal.

R-BGAN
An IP-based entry level device within the BGAN range of terminals which provided data only packet-data connectivity. This service was retired at the end of 2008.

Aero H / H+
Supports multi-channel voice, fax and data communications at speeds up to 9.6kbps anywhere in the global (hemispherical) beams of Inmarsat's satellites.

Aero I
Brings multi-channel voice, fax and data at up to 4.8kbps to corporate aircraft, military transports and regional airliners through smaller, less expensive terminals.

Aero L
Provides airline and government operators with global, real-time, two-way data communications, principally to support air traffic control and airline operations.

Mini M Aero
Suited to border patrol, coastguard, emergency services and remote-area operations applications. Supports a single channel for voice, fax or 2.4kbps PC data, SIM-card capability and STU-III encrypted voice.

Aero C
For non-safety-related text or data messages from anywhere in the world. With integrated GPS, it can be readily installed in corporate and general-aviation aircraft and helicopters, and offers two-way store-and-forward data communications, messaging, polling and position-reporting.

Exhibit B - Inmarsat 4 Satellite Footprints